

Course: Probability†and†Descriptive†Statistics

Dept: Mathematics

Grade Levels: 11, 12

Graduation Information:

This course (#4340) is applicable toward the graduation requirement for Mathematics (gen.)

Credit: 5.00 Duration: One Sem. Max. Semesters: 1

Prerequisites:

Algebra 3

Fees and Materials:

Scientific†calculator†and software recommended

Short Description:

This course will prepare the student to understand the use of common descriptive statistics. It will prepare the student to use conventional data interpretation techniques in a variety of academic, business, and social applications. Topics include: an introduction to experiments and surveys, descriptive statistics, probability, probability distribution, normal distribution, and estimation on sample size of means.

SUGGESTED OUTLINE

A. Introduction to statistics

- o uses and abuses of statistics
- o nature of data
- o statistical experiments and sampling
- 1. define population, sample, parameter, statistics
- 2. question the validity of statistical statements as relevant or not
- 3. define discrete and continuous numerical data and different levels of measurement
- 4. define the different sampling styles and be able to identify advantages and disadvantages of each
 - o random
 - o stratified
 - o systematic
 - o cluster

B. Descriptive statistics

- o summarize data
- o pictures of data
- o averages
- o dispersion statistics
- o measures of position
- o exploratory data analysis
- 1. construct frequency tables
- 2. use pie charts, histograms, frequency polygons, and ogives
- 3. find the mean, median, mode, midrange, and weighted mean

4. define and use range, standard deviation, and variance
5. define and use the standard score (Z score) and percentiles
6. use stem-and-leaf plots and box plots

C. Probability

- o fundamentals
 - o law of large numbers
 - o addition rule
 - o multiplication rule
 - o complements and odds
1. define a simple event, compound event, sample space, and randomness
 2. describe the law of large numbers
 3. use the addition rule to find the probability of a compound event
 4. use the multiplication rule for dependent events
 5. find and use conditional probability
 6. define the rule of complementary events
 7. define the odds in favor and against an event

D. Probability distribution

- o random variables
 - o mean, variance, and expectations
 - o binomial experiments
 - o mean and standard deviation for the binomial distribution
1. define random , discrete random, and continuous random variables
 2. compute the mean, variance, and expected value of a discrete random variable
 3. use the binomial probability formula to find probabilities
 4. compute the mean and standard deviation for the binomial distribution

E. Normal probability distribution

- o the standard normal distribution
 - o nonstandard normal distribution
 - o the central limit theorem
1. define and use the standard normal distribution
 2. compute the probability that the Z score lies in a certain interval
 3. find and use the Z score from a nonstandard normal distribution
 4. state and use the central limit theorem
 5. find scores when given probabilities
 6. compute the standard error of the mean

F. Estimates and sample size of means

1. compute the best point estimate of the population mean μ
2. compute the maximum error of the estimate of the population parameter

3. define and use the confidence interval
4. define and use the student t-distribution